

THE ROLE OF COLOUR IN FILMS: INFLUENCING THE AUDIENCE'S MOOD

Daniel James Berens

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The Role of Colour in Films: Influencing the Audience's Mood

Abstract

This research explores the role colour plays in influencing an audience's mood. The study reveals that the perception of colour, colour combinations and colour memory are not universal but is affected by the language we speak, our culture, environmental factors and even our gender. Colour perception is even affected by sound as well as other colours. Research also shows that colour directly affects our emotional state, influencing behaviour, sleeping patterns, aggression and how energised we feel. Bright, saturated and long wavelengths, are more stimulating and arousing than less saturated, darker and shorter wavelengths of light. The study looks at the symbolism of colour in films and has found that colour can mean many seemingly contradictory concepts even within the same film, showing that context of colour plays a major role in its meaning. Ultimately cinematographers, whether realising it or not, make use of neuroscience and symbolism to affect an audience.

Introduction

This study looks at one of the most powerful, but least understood and explored elements of cinematography: colour. From Alfred Hitchcock's dramatic black and white film, *Psycho* (1960), to Vittorio Storaro's symbolic colours in *Apocalypse Now* (1979), colour has the ability to affect us either consciously or unconsciously. By gaining a scientific insight into the way colour affects people neurologically and physiologically, the aim of this study is to gain a greater understanding of the ways in which colour influences people's moods. Then, by taking this understanding and analysing films, the intention is to show how some of the best cinematographers in the world use colour as an important device to influence people. Also, by giving cinematographers crucial knowledge to make their unconscious creative decisions conscious, the study hopes to empower them in creating more meaningful and more emotionally powerful films.

In cinematography, there has been little research in this field and colour may be poorly attended given to how ubiquitous it is (Peacock, 2010). This study reviews the science of colour and the use of it in cinema, identifying Vittorio Storaro as an influential colourist. Like Hirsch (2011), Malpas (2007), Coates (2010), Brown, Street and Watkins (2013), this study will take a symbolic, psychological and aesthetic approach to the analysis of colour in films. Ultimately this research considers how science can give new creative tools to artists in a digital age, set against the history of colour within analogue film techniques.

Unlike other studies, this study acknowledges the difference between light (electromagnetic radiation which is not directly visible) and colour (a perceptual

experience constructed by the brain). As such, black and white will be considered colours in this study, since they are perceived in the brain like any other colour.

The Importance of Colour

In the article *Colour, Form, and Movement Are Not Perceived Simultaneously*, Viviani and Aymoz (2001) explain that colour and form are almost experienced simultaneously while movement is delayed by about 50 milliseconds. Since we perceive colour before movement and since cinema is essentially moving colour, Brown (2013, p.209) argues that colour is a spectacle and just as important as narrative which “has at its core in-frame movement”.

Colour is known to influence people in ways that are not immediately apparent and so the use of it to affect an audience has been exploited in films and many domains and colour science continues to form new discoveries. Recently it was shown that certain colours in the right context can enhance memory (Kuhbandner and Pekrun, 2013). It has even been used by high street and online shops to increase sales by stimulating positive moods through longer wavelengths with faster background music (Cheng et al., 2009; Aslam, 2006).

Chapter One

The Science of Colour:

How universal is the perception of colour?

The fusion of art and science

The approach adopted here is to gain a scientific grounding, specifically in the field of neuroscience and physiology, to understand how colour affects people and to understand how universal colour perception is. Abramov et al. (2012) suggest that men and women do not see the same colours; males need longer wavelengths than females to experience the same hue: “females are better at discriminating among colours...while males excel at tracking fast-moving objects and discerning detail from a distance” (Owen, 2012, p.1). Lee and Joohyeon (2005) highlight the two categories for the perception of colour: the biological response and colour memories (the learned and cultural response). This chapter will seek to unpack these responses in light of the scientific evidence. Neuroscientists from The Sussex Colour Group (a leading colour science research group) were interviewed to hear their results and explanations on how colour can affect people’s psychology.

Finally this chapter will build upon these fundamentals by overviewing the science in the context of cinema. The aim is to show how universal the perception of colour is and how it is influenced by many factors including language, colour memories, colour consistency, colour combinations and even by the cinema experience itself.

Neuroscientist Sam Berens (from the University of Sussex) explains that we see colour through a filter of language and memory, making everyone’s perception different. Our language determines how we categorise colours into groups and this

embedded linguistic grouping system influences how we see and think about colour. Berens also highlights that memories may be associated with certain colours and so can be stimulated by colour perception. This section will delve deeper to understand how significant this is and why different factors affect the perception of colour making no two people see colours in the same way. In light of this science the study will ask what this means for cinematographers and image makers who may need to influence the emotions of a wide audience rather than any particular culture.

Categorical Perception in Adults:

The effect language has on the experience of colour

The right hemisphere of the brain is implicated in non-categorical chromatic processing, thereby giving rise to metric colour sensitivity. This means that the right side of the brain does not identify colours within any sort of linguistic category such as blue or green. In contrast, the left hemisphere language regions are associated with the categorical perception of colour. This lets us see colours within our own linguistic categories allowing us to group colours and quickly differentiate them from other categories, having huge implications on the way we see (Regier and Kay, 2009; Bird et al. 2014; Franklin et al., 2008). As such, colours from different categories seem very different from 'within category' colours, even when these colours are equally spaced along the spectrum. In Figure 1, even though these four colours are equally spaced by a hue angle of 26.37 degrees, G1 seems greater in difference than from the other colours (B1, B2 and B3) thanks to the linguistic distinction between green and blue.

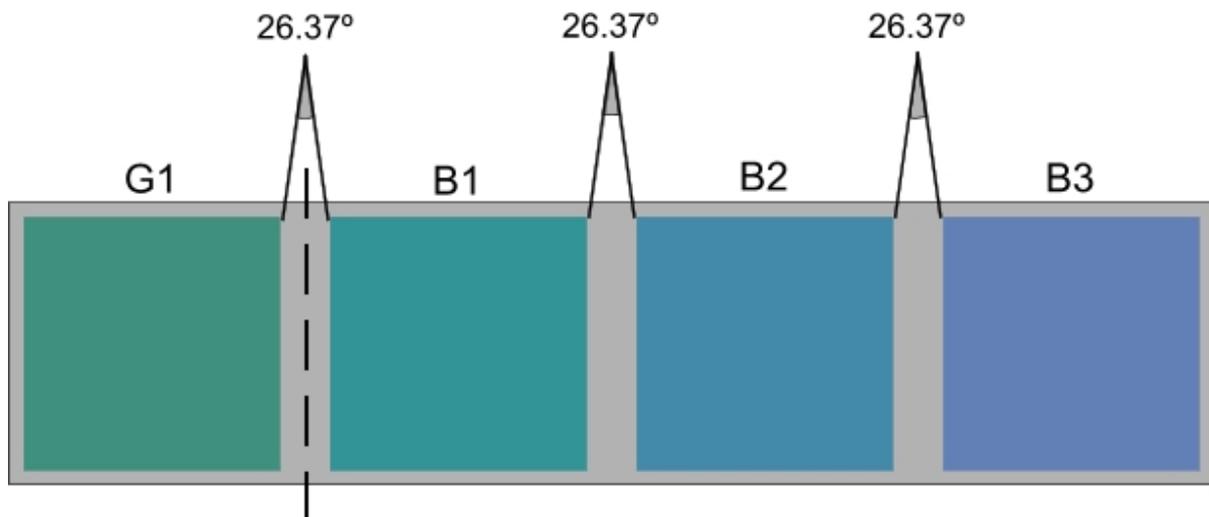
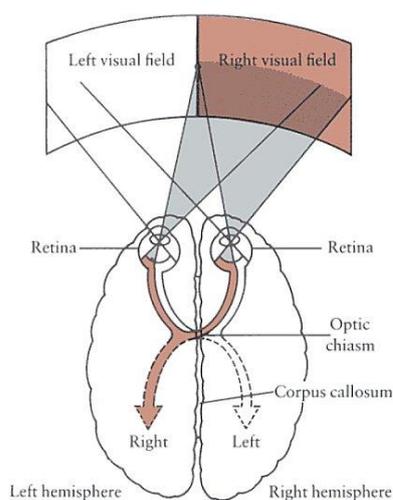


Figure 1. Sam Berens (2012)

‘The Whorfian hypothesis’, proposed by Benjamin Lee Whorf (see Regier and Kay, 2009) attempts to account for this by suggesting that colour categories, which are entirely constructed by language, warp visual input in line with learned colour names. As such, the hypothesis suggests that “languages with different naming schemes should produce different perceptual colour spaces” (Berens, 2012, p2); therefore “colour naming is determined by culture” (Pos, 2010, p.40) meaning that the perception of colour is not universal. From language to language, the position of the colour categories varies; thus the point at which one colour stops and another colour begins is always different. An extreme example can be seen in Papua New Guinea where native speakers of the Berinmo language regard blue and green as the same since their language does not have separate words to describe them. As a result they do not differentiate between them, however they have other unique colour categories which English and many other languages do not have (BBC, 1999; Regier and Kay, 2009).

This Whorfian hypothesis contrasts with the ‘Universalist’ theory which argues that colour categories are biologically hardwired meaning that colour perception is universal (see Regier and Kay, 2009). As consensus has shifted back and forth between the two hypotheses, it has recently been shown that both hypotheses are partly correct. Regier and Kay (2009, p.1) explain this by suggesting that “half of our perceptual world might be viewed through the lens of our native language, and half viewed [with less of] a linguistic filter”. Our vision is made up of the left and right visual fields which are processed by the right and left hemispheres respectively (so-called contra-lateral representation). In other words, the left visual field (LVF) is processed by the right hemisphere of the brain (where non-categorical chromatic processing occurs) and the right visual field (RVF) is processed by the left side of the brain, which is also responsible for language and thus colour categorisation (Regier and Kay, 2009; Bird et al., 2014; Berens, 2012). This means that we process colour differently depending whether what we see is on our left or right side of our field of view (see Figure 2). This has implications for cinematographers who must understand how differently their colours might be perceived around the world. If, for example, cinematographers choose one palette of colours, such as blues, they must understand that it may not be seen as one category of blues in a foreign language.



Instead it could be perceived as two groups of colours or vice versa.

Figure 2. University of California, Riverside (n.d)

Colour and Emotion

Colour directly affects people's emotional state (Conway, 2012) and many scientists have studied the effects of different lighting conditions on people's feelings (e.g. Radulescu et al., 2012; and Küller, 1986). Küller (1986) explains that in addition to converting light into electrical impulses which affect various visual areas, such impulses travel to hormone and nerve centres in the brain indirectly affecting people's hormone balance and psychological state. Such an example can be seen in the pineal gland in the brain which controls a person's diurnality (sleeping patterns) based on how the gland reacts to light and darkness.

Küller (1986) also suggests that:

Glaring light, strong colours, and contrasts might produce an increase in [reticular] activation [thereby causing psychological arousal and alertness]. Long-wave light (red) might be more activating than middle and short-wave (green, blue). When it comes down to flicker, even if it cannot be seen by the naked eye, it might lead to excessive activation (p.3).

Valdez and Mehrabian (1994) note that shorter wavelength colours (blue and green) are less arousing than longer wavelengths (red and yellow) and that: "arousal is a positive correlate of color saturation and brightness" (ibid, p.396). Cheng et al. (2009) support this when saying "warm colours, especially red, are physically and emotionally arousing, exciting and distracting; whereas cool colours, especially, blue are relaxing, peaceful and calm" (p.327). Interestingly, to reduce suicide-railway disruptions, Japanese rail companies have incorporated blue lighting on railway platforms which appears to have contributed to a sharp fall in people jumping in front of trains (Matsubayashi, Sawada and Ueda, 2012). This may be due to the fact that blue is more pleasurable and less stimulating/arousing than warmer lighting (Valdez and Mehrabian, 1994), which might otherwise help give energy that would drive a

person to carry out their suicide plan. Blue lighting on streets has also been shown to reduce crime (Grohol, 2008; Chicago Tribune, 2008). This might be due to the fact that blue is a calming, tender and soothing colour which also universally represents police presence and therefore security (ibid; Valdez and Mehrabian, 1994). At the opposite end of the spectrum, Attrill et al. (2008) have shown that red shirts have helped English footballers win games substantially more often. Guéguen and Jacob (2012) show in restaurants, that male customers give higher tips to waitresses wearing red clothes, since red makes them seem more attractive. Bagchi and Cheema (2013) highlight that scientific research shows that red induces arousal which may lead to aggression. Their results show that red as a background colour increases more aggressive steps in an auction as opposed to blue which decreases steps even more rapidly than grey. Bagchi and Cheema also show that red decreases offers in negotiations while blue increases them. This could be very useful to cinematographers who need to know how colours affect people so that they can use this in cinema. It might seem obvious that red increases anger and stimulation while blue makes people calmer and more relaxed, but by knowing this science, it can help cinematographers understand, change and defend their creative decisions to create more powerful films.

As we have seen, colour is partly seen universally and partly influenced by language, so this raises the question of just how universal the human emotional reaction to colour is. Bellantoni (2005) conducted a small experiment in which he asked art and film students, from across the world, to paint pictures of emotions. The results can be seen as surprisingly similar; light, pale, blue and peach colours were used for tranquillity while dark red and contrasting colours were used for rage. Scientific research supports this: in one study “every adult assigned yellow to happiness, blue

to sadness and red to anger” (BBC, 2011). Businesses already capitalize on the neurological science of universal colour perception in marketing. A number of brand and product marketing professionals explain the workings such as in Aslam’s (2006) article, *Are You Selling the Right Colour?* and Cheng et al.’s (2009) paper, *The Effect of Online Store Atmosphere on Consumer's Emotional Responses*.

Many studies on colour have shown that in industrialised cultures people generally prefer blue colours to yellow colours (Valdez and Mehrabian, 1994; Ou et al, 2003; Taylor, Clifford and Franklin, 2012). It has been shown that people like or dislike colours to the degree which they are associated with objects that are liked or disliked (ibid). For example, Taylor, Clifford and Franklin (2012) explain that blue is liked because it is considered good for survival since it is associated with pure water, while green-yellow is the opposite since it might be associated with faeces and rotten food. However, by comparing British adult colour preferences to those of a non-industrialized culture of the Himba people, Taylor, Clifford and Franklin (2012) have shown that colour preferences are not simply universal or genetically driven as previously thought, but instead are influenced by culture, social or environmental forces. This difference might be due to the fact that the Himba people are surrounded by natural materials while industrialised cultures are dominated by artificial, high colour saturated objects (ibid). There has also been some research on the effects of colour combinations. In general, people prefer disharmonious colour combinations to harmonious colour combinations; however they are more likely to dislike harmonious combinations than like disharmonious combinations (Ou et al, 2003, p.389). By understanding people’s colour preferences, it will give

cinematographers a better indication of how different cultures will view colours aesthetically, which ultimately influences their enjoyment of a picture.

The Difference between Colour Perception and Memory

Henry, Cheung and Westland (2008) explain that we have three types of colour memory: two types of long-term recall and one type of short-term storage. “Long-term colour memory seems to have a cognitive component in terms of users’ preferred colours and is also influenced by an individual’s precision of matching” (ibid, p.1). We share surprisingly precise, however not accurate, expectations of what commonly perceived colours should look like (Hurkman, 2011). Hurkman (2011) points out that memory colours are not the same colours we see in reality and are more saturated than “actual measured saturation of the original subjects” (p.293). This supports Henry, Cheung and Westland’s (2008) findings who have also shown that colours remembered are “much more saturated” (p.1) and that colour memory also deviates in “lightness and brightness attributes while hue also deviates but in a less predictable manner” (ibid). In 1946, in the paper *Investigation of Human Colour Memory*, Bodrogi and Tarczali presented their results:

Brick appeared to be remembered as redder than the object, sand as more yellow, grass as greener, dry grass as more yellow, and pine trees as greener. Lightness of the memory colours, in all cases except brick, ran higher than in the object color perceptions (Cited in Hurkman, 2011, p.293).

This raises the question; if what we expect to see is different from reality, should cinematographers and colourists aim to reproduce these memory colours? In the paper *Does an Expert Use Memory Colors to Adjust Images?* Boust et al. (2004) have shown that viewers prefer images that use memory colours over those that use

original colours. Furthermore Boust et al. (2004) also concluded from their results that image-making professionals do change colours to match their own memory colours, particularly for natural materials like skin, grass and the sky.

The Interaction between Colour and Sound

In the book *Perception and Imaging*, Zakia (2007, pp.142-143) explains that it is well known that sound influences colour perception due to a neurological phenomenon known as synaesthesia; literally meaning a mixing of the senses, such that sensations in one sensory modality can cause conscious perceptions in a completely different sensory modality. However Synaesthesia is a rare neurological condition present within approximately 4% of the population (Baron-Cohen, 2013 and Garfield, 2006), so how can colour influence sound for the rest of us? In an interview with Sam Berens, he explains that one of the more common forms of synaesthesia is tone-colour synaesthesia, where listening to sounds results in a "hallucinated" experience of colour. Interestingly, synaesthetes with these experiences tend to agree on which sounds map onto which particular colours, more than would be expected by chance, suggesting there may be a hard-wired biological mapping between colour and sound (Ward, 2006). Furthermore, while such synaesthetic experiences exist for a select few, recent research has shown that when non-synaesthetes are asked to select the most appropriate colour for a particular tone, they also agree on the mappings more than would be expected by chance (ibid). Specifically, high tones seem to be associated with bright yellows and low tones with dark blues (BBC, 2011). Professor Jamie Ward (psychologist at the University of Sussex) has shown that we are all partly synaesthetic (Garfield, 2006). In an experiment involving 200 people, Ward asked them to choose which animation better matched the music. One colour animation was made by non-synaesthetes to

accompany the music and another colour animation was designed by synaesthetes. The subjects overwhelmingly chose the synaesthetic-made colours, suggesting that even though we do not know it, we are all synaesthetic to some extent (ibid). In light of the evidence it can be speculated that to produce a more harmonious scene, the colours in the composition should match the equivalent sound colours. Conversely, when needing to produce a more uncomfortable possibly dramatic scene, there should be colour-tone dissonance. Since this science is not widely understood, it may explain why it might not be fully exploited in cinema. If this was used in cinema it might make films more emotionally powerful, giving new techniques to affect an audience: colour-tone dissonance may induce anxiety while colour-tone harmony might reduce anxiety. As this science becomes more widely understood, cinematographers and sound designers/composers may come to collaborate more closely as they become aware that their own choices affect the perception of each other's compositions.

Chapter Two

Vittorio Storaro, winner of three Oscars and one BAFTA for best cinematography (Storaro, 2013), is known for his opinion on the importance of colour as an instrument in cinema. In his book *Storaro: Writing with Light: Colors: 2* (2004) he explains the symbolism of colour, not just in his own films but in the wide scope of art. For Storaro colour can represent numerous things: for example white represents the body, red – vital energy, orange – growth, love and family, green – nature and life. (Storaro, 2004).

The work of Storaro will be explored to see how colour symbolisation is used in three of his films originally made between 1979 and 1990: *Dick Tracy* (1990), *The Last Emperor* (1987) and *Apocalypse Now Redux* (2001 version). The importance of colour will be discussed, the choices and use of it, and the significance it has in his films. The aim of this chapter is to conclude the effectiveness and use of colour in Storaro's celluloid films.

The Importance of Colour for Storaro

Storaro explains how influential colour can be:

Since the beginning of time, the body reacts one way: you expose the body to light (or yellow), you get activity, you need to work. Each time you expose the body to darkness (or blue), you need to rest. Since the beginning, the human body has made this journey into night and day. Today scientists have proven that your body changes in the presence of a particular color. Your body reacts differently to different colors. You become more active or more relaxed or more depressed. Even your blood pressure may change (Schaefer and Salvato, 2013, p.225).

As discussed, red affects people in many ways by making them more stimulated. In an interview at Camerimage 2013, (Figure 3), Storaro supports this when explaining how even wearing red influences his mood of that day:

Why am I wearing this colour today? I feel that I need some kind of energy to speak with you guys. Normally without thinking I select the colour from my dresser according to my mood of that day, according to that scene I'm going to film. Believe me sometimes I don't do it in a conscious way; I do it in an unconscious way because those energies, those vibrations, help for that specific moment in my life. It's called chromatherapy.

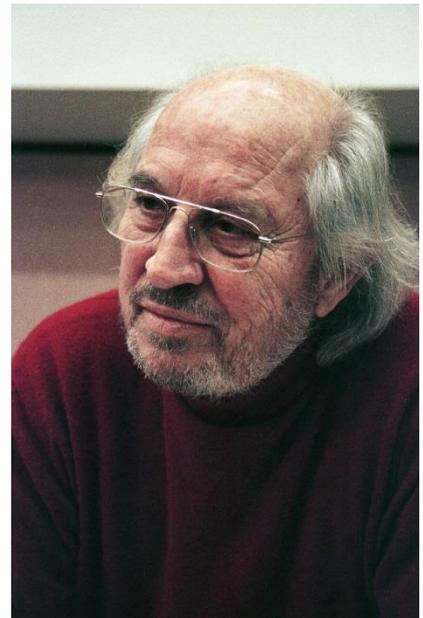


Figure 3. At Camerimage 2013

Storaro's learning and inspiration came from watching the early Walt Disney cartoons which he regards as one of the best uses of colour in cinema: "every single colour was [carefully] selected by the technician, the creative people of Disney", they had to know colour theory, "because they have to speak with the very simple mind of [the child]." Storaro points to an example of the red apple in the film, Snow White

(Figure 4). “Why the apple is red? It could be green.” Storaro explains that it is because of the symbolism and the meaning of red.



Figure 4. *Snow White and the Seven Dwarfs* (1937)

After being influenced by Disney, Storaro later undertook research into colour and discovered: “in psychoanalysis, every color represents something specific in an emotional sense. It’s not something that I made up; it’s something that scientists and researchers have studied” (Schaefer and Salvato, 2013, p.225).

Storaro explains that his approach to designing the colour palette in a film comes after he reads the script, discusses the direction of the film with the director and to “find what is the main idea and how it can be represented in a symbolic, emotional, psychological, realistic and physical way” (Schaefer and Salvato, 2013, p.222).

Sometimes Storaro’s choice of colour palette is unconscious:

Sometimes you really can’t explain it. It arrives to you by intuition and you do it [...] some time later you may discover why. Honestly, I didn’t know why I did all Paris in blue tones for *The Conformist* and then two years later I did it in orange for *Last Tango in Paris*. At the time, it was the feeling I got through these kind of wavelengths and through these kinds of color (Schaefer and Salvato, 2013, pp.227-228).

At Camerimage 2013, Storaro stresses the importance of learning about colour when we make films: “we should be more aware about the meaning. What it means to use that colour, [or] the red colour, [or] that blue colour, [or] the yellow colour next to a complementary one [and so on].” When we know what colour means only then can we “be strong to defend our images” and create more expressive films, explains Storaro.

Dick Tracy

Since *Dick Tracy* originally evolved from a comic strip, the film’s visual style stays faithful to the original text, keeping the franchise identifiable as a visual fingerprint. Since the genre is a film noir comic book movie, it has allowed Storaro to use unrealistic (unmotivated) and very pure (saturated and therefore unnatural) colours since the narrative itself is the opposite of realism. This has freed Storaro to use a wide range of colours, carefully chosen in a similar way to the artists in early Disney films.

Yellow obsession



Figure 5. *Dick Tracy* (1990)

Yellow is a contradictory colour that is disliked and increases anxiety; however it is associated with happiness, wealth and knowledge/wisdom (Storaro, 2004; Bellantoni, 2005): “people in the doldrums believe yellow is light and sunny and will cheer them up. But yellow creates anxiety and makes you more stressed out... In yellow’s presence, you’ll be more apt to lose your temper” (cited in Bellantoni, 2005, p.79).

Bellantoni (2005) identifies yellow as a signal in films which highlights obsession since it is a colour which increases anxiety and lingers in our minds the most. Yellow is used in Dick Tracy’s obsessive yellow dress code (Figure 5): his yellow jacket and hat identify him as an obsessive person who always thinks about his duty first. Therefore he prioritises his job over his personal life, triggering his relationship problems.

Red has multiple meanings



Figure 6. *Dick Tracy* (1990)

Red is used to scream murder to the audience in Figure 6, where a police officer is shot before he can report suspicious activities inside a warehouse. Inside the warehouse (Figure 7) red is also used in the surrounding mise-en-scène, showing the murder of Lips by Big Boy's men, who force him to sign the deed to his property and later kill him.



Figure 7. *Dick Tracy* (1990)



Figure 8. *Dick Tracy* (1990)

Red is not just used to warn us of murder. In Figure 8, red lighting is used to accentuate the anger, frustration and tiredness of the dancers after being berated and mistreated all night by Big Boy. As discussed in chapter one, red helps to increase the audience's anger, which in this scene makes us empathise with the dancers.



Figure 9. *Dick Tracy* (1990)

Lastly red is used to show the close relationship Dick Tracy has with the orphan and his love for Tess (Figure 9). Red clothes are worn and also used in the background sets, such as in the dinner scenes.

Purple

In the book, *If It's Purple, Someone's Gonna Die*, Bellantoni (2005) points to many examples in films where purple is used to foreshadow death. It is not just used to literally indicate death, but to symbolise the end of something. He explains how the colour purple is used as a clue for the twist ending in *Dick Tracy* (Figure 10). Purple lighting is used subtly to give psychological clues to the audience by linking the characters Breathless Mahoney (a witness to Lips's murder, who tries to seduce Dick Tracy) and The Blank (an enigmatic faceless character bent on overtaking Big Boy and becoming the next criminal to rule the city). Breathless Mahoney is first introduced whilst performing onstage, surrounded by a purple lit environment. Likewise the first time we see the Blank, he is surrounded by a purple lit window. By the end of the film when the Blank is dying and is unmasked by Tracy, he is revealed

to be *Breathless*. This twist ending seems natural due in part to the psychological conditioning and the symbolism of the colour purple.



Figure 10. *Dick Tracy* (1990)

Apocalypse Now Redux

As in *Dick Tracy*, in *Apocalypse Now Redux* (2001), Purple is used as an 'omen' for death (Bellantoni, 2005). Such an example can be clearly seen half-way through the film where Captain Willard and his escorts are boating up north, upstream into ever dangerous and unpredictable territory (Figure 11). This omen starts when Lance B. Johnson opens rare purple flares and starts playing with them. The purple flares rapidly surround the whole boat, and since purple is a polar opposite to the light green forest that surrounds them, the colour contrast increases and so too does the significance and emphasis of this purple omen. Shortly later when caught by surprise they are bombarded with deadly rocket propelled projectiles. Tyrone Miller, a teenager, who was listening to a taped message from his mother asking him to come back home safely, dies.



Figure 11. *Apocalypse Now Redux* (2001)

Orange and yellow

Like red, orange and yellow are very stimulating and aggressive colours which stand out. They are used in warning signs in nature as well as manmade signs. Bellantoni (2005) describes the orange symbology in *Apocalypse Now Redux* as the “exhaust from hell”; in this film it provides a clear warning to America’s enemies symbolising death (Figure 12). Yellow and orange are used for the colour of explosions, napalm and flares and even Lieutenant Colonel Bill Kilgore’s helicopter has ‘Death from above’ written in orange. Kilgore even wears a yellow band around his neck

indicating that he is poisonous to his enemies, which is similar to poisonous animals in nature.



Figure 12. *Apocalypse Now Redux* (2001) - As the helicopters fly through the orange sunset to carry out their operation, the symbolism warns us that death is coming.

The Last Emperor

Taken from Pu Yi's point of view (who became the last emperor of China), the film begins when he is an old man in a Chinese prison of war camp. During his time in incarceration flashbacks reveal the life he once had, showing his coronation as a child emperor, his upbringing, and the problems he faced as his empire crumbled during the Chinese communist revolution. These two worlds in the film; emperorship and imprisonment (already being polar opposite situations) are accentuated further by colour in a distinctive way. The cold sickly green colours of the prison are a world away from the bright warm red, yellow and blue colours representing luxury of emperorship (Figure 13). Red warm colours stimulate our senses, ideal for an intriguing unfamiliar culture while green blue colours provide the opposite, relaxing

our senses, in keeping with the concept of a prison of a quiet solitude working life. As discussed, colours are purer (more saturated) in our memories than in reality and these purer memory colours are used for the flashbacks in the film. This use of colour helps the audience take a more subjective look in Pu Yi's mind as he remembers his past.



Figure 13. *The Last Emperor* (1987)

The Use of Colour in Storaro's Films

Storaro is an influential passionate advocate for the power of colour cinematography. However what is most striking about the use of colour in Storaro's films is that much of it is in production and costume design rather than lighting, filters, and grading. Although colour cinematography is hugely important in Storaro films, such as in *Dick Tracy* where coloured lighting plays an important role in the meaning of the image, it is clear that that the decision of the colour palette of a film lies within the production designer's and cinematographer's collaboration. Storaro has evidently worked closely with his production and costume designers; this can be seen in *The Last Emperor* where cool bluish-green lighting was selected alongside the green costumes and sets for the prison scenes, while warmer lighting with bright vivid sets and costumes were chosen for the flashbacks. Both colour cinematography and production design have to work harmoniously to achieve the colour palette of a film otherwise there are two different visions, opposing ideas of how the film should look. Because there is a blur where cinematography stops and production design begins, perhaps this means production designers should be present for colour grading along with the cinematographer.

Chapter Three

21st century:

The varied use of Colour in Digital Films

In this chapter, the differences in colour used between analogue and digital film production will be shown by reflecting upon the significance of three digitally produced films from the twenty-first century: *Sin City* (2005), *Amélie* (2001) and *Slumdog Millionaire* (2008). As Hurkman (2011) mentions in his *Color Correction Handbook*, the contemporary controls open to filmmakers have transformed the way films are made, allowing for a finer degree of manipulation of colour design. This has made it possible for *Sin City* to isolate colours against a black and white picture and *Amélie* to use highly selective adjustments, creating surreal images. In *Slumdog Millionaire* however, it is used more subtly and naturalistically, showing that not all digitally created films use colour so boldly. *Slumdog Millionaire* uses stimulating bright colours that may be associated with India's culture, showing happy moments between Jamal (the main character) and Latika (his lover). This chapter aims to show how varied and effective the use of colour can be in digitally made films and the new possibilities open to filmmakers. Finally the study will reflect upon what these new digital workings and scientific research mean for the future of cinema.

Sin City: Colour preferences

Sin City contains a number of disjointed stories about the violent crimes and murders in one city and, like *Dick Tracy*, it is based on a film noir comic strip. The three key stories centre on Hartigan, the Hitman and Dwight.

Red

Malpas (2007) regards red as the “most powerful colour in our compositional armoury” (p.24), partly due to ‘colour perspective’ where warm colours seem closer to the viewer (Freeman, 2007). When red is used in *Sin City*, isolated against black and white, the effect is even more powerful, helping to show beauty, death or love much more dramatically and making the scenes easily remembered.



Figure 14. *Sin City* (2005)

The film begins with an attractive woman in red who appears to have no reason for wanting to end her life and has paid 'The Man' to kill her. Red may symbolise her death as well as showing her beauty (Figure 14).

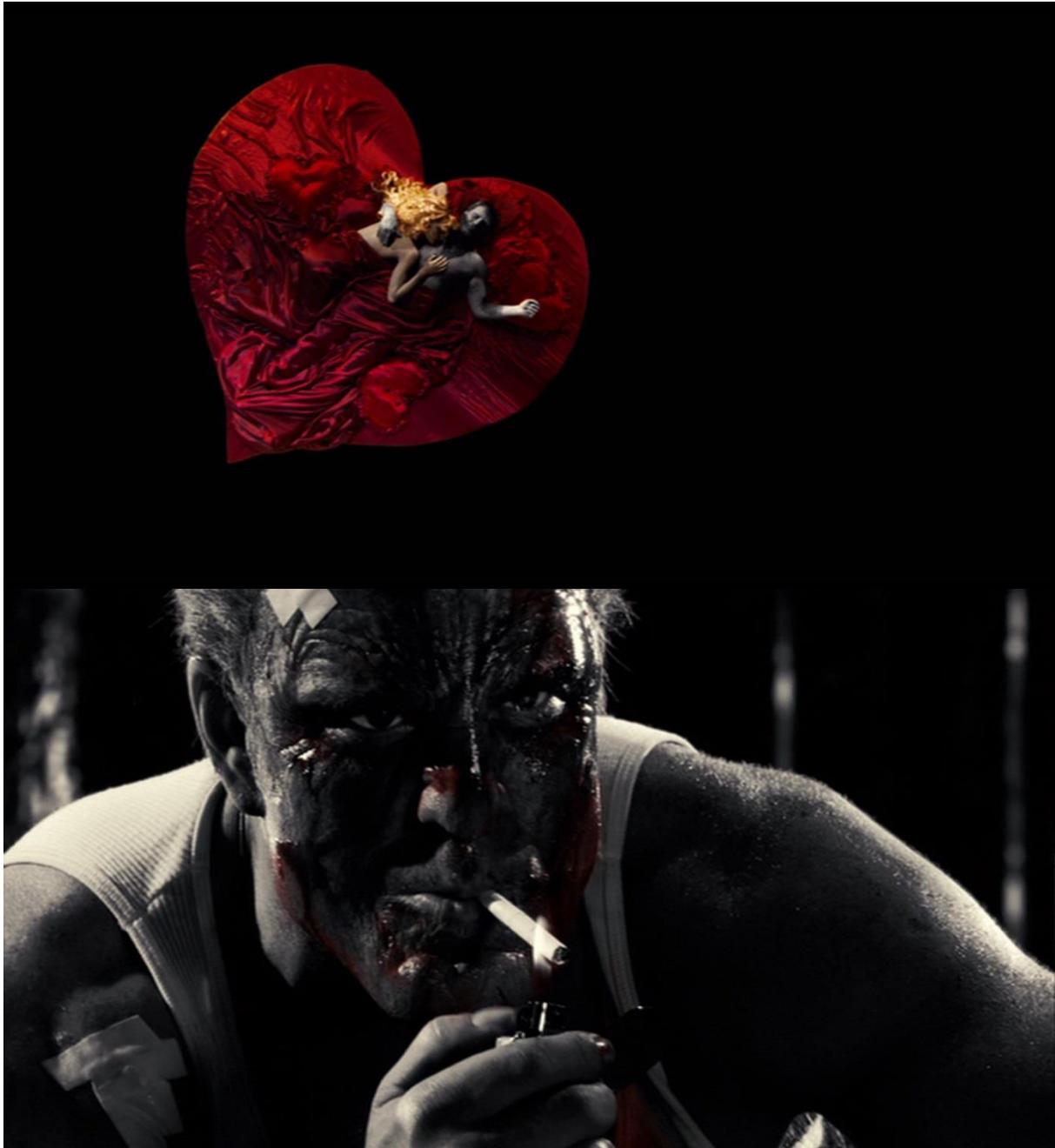


Figure 15. *Sin City* (2005)

In the story, *The Hard Goodbye* (Figure 15), driven by revenge, 'The Hitman' hunts down and kills the people connected with and responsible for the death of a girl who

he hardly knows, but who he fell in love with the same night she was murdered. Red helps show his gory revenge for his love as he pursues his quest (Figure 15).

Bright white

Bright white, a colour in many cultures often associated with purity (Malpas, 2007; Storaro, 2004; Pastoureau, 2010), is used here to highlight blood and pain of a pure uncorrupted policeman, Hartigan (Figure 16).



Figure 16. *Sin City* (2005)

Yellow

In the short story, *That Yellow Bastard*, 'Yellow Bastard' (an evil smelly character) has been chosen to be depicted as yellow (Figure 17). But why yellow? As discussed, yellow, a colour almost universally disliked as a colour preference, is chosen to enhance the audience's hatred towards him.



Figure 17. *Sin City* (2005)

Blue

Blue is used in *Sin City* to represent beauty, such as in girls' eyes and even on stylish cars (Figure 18). As previously highlighted, blue is opposite to yellow as a colour preference.



Figure 18. *Sin City* (2005)

Amélie: Green & Red

Amélie is about a young woman called Amélie who finds unusual ways to gain pleasure from her everyday life.



Figure 19. *Amélie* (2001)

Red and green are the main colours which make up *Amélie* (Figure 19). The colour relationship between red and green, which are on opposite sides of the colour wheel, provide maximum colour contrast making colours appear more vibrant (Malpas, 2007). This colour theme is played out in almost every scene in the film, even when the red and green colours do not exist in the production design; digital colour grading

has made it possible to selectively tint and accentuate the red and green colours in the picture. Grading has made it possible for green to be used for shadows while red and warm colours are used for the highlights.

Red



Figure 20. *Amélie* (2001)

Amélie wears red in almost all of the film. What is its significance? As discussed in chapter one, Guéguen and Jacob (2012) have shown that waitresses seem more attractive when dressed in red, showing that red does help to highlight Amélie's beauty.

According to Pastoureau (2010), red used to be associated with masculinity since red represented war and power. Examples can be seen when red was used in the Russian Army (symbolising defence of freedom), later for the Red Army flag (Solntseva, 2013) and even on British soldiers' uniforms until the 1900s (Leeson, 2008), which perhaps contributed to British military success. In modern times however, Pastoureau (2010) explains how red is now considered a feminine colour due to its symbolism of love and pleasure, which is why Amélie wears red and lives in a red flat (Figure 20). Perhaps if the film *Amélie* was made earlier, red would be inappropriate because of its masculine associations. The key point is that colour symbolisation changes not only with cultures but over time.

Green



Figure 21. *Amélie* (2001)

Green is often associated with nature, instability and positivity (Pastoureau, 2010, p.97). The film often uses it to highlight the pleasure of nature. Storaro (2004, p.84) describes green as among many other things "...the color of Mystery, of Representation, of DESTINY". This is interesting since in *Amélie*, green is used when an old man is mysteriously reunited with his long lost childhood toys or when Nino discovers torn up pictures of a mysterious man underneath photo booths all over the city (Figure 21). Green grading also highlights the destiny between Amélie and Nino who fall in love.

Slumdog Millionaire:

Yellow, orange and blue



Figure 22. *Slumdog Millionaire* (2008)

In a similar way to *The Last Emperor*, *Slumdog Millionaire* takes place at different times using different colour lighting to depict the reflection on the past and the present where Jamal is playing the Indian game show, *Who Wants to Be a Millionaire* (Figure 22). These stories are represented with different and contrasting colour palettes. Dark blue is used to show the present at the game show whilst high key colourful yellows and oranges are used to show happy nostalgic times.

The Influence of Digital Techniques

Digital effects and colour grading have opened new possibilities to the use of colour in films. In *Sin City* it has allowed colours to be selected and isolated against black and white backgrounds producing striking symbolic and a unique film noir aesthetic. In *Amélie*, a film about pleasure, colour grading has allowed the film to be graded to such a degree that it is essentially composed of just two main colours, red and green which symbolise pleasure. However digital technology does not always change the way we use colour in films. In *Slumdog Millionaire* (a film showing more realism), colour usage is used more subtly and realistically like in *The Last Emperor* and *Apocalypse Now*.

Conclusion

Colour plays an important role in films which, like any three dimensional character, often has complex seemingly contradictory inharmonious properties, even within a certain cultural perspective, giving richness to cinema. Its meaning is partly influenced by its context. For example, yellow is associated with happiness but is almost universally disliked and can stimulate anxiety; it is used to make an evil character more hated in *Sin City*, however it can be used to depict happy loving memories as in *Slumdog Millionaire*. Any single colour can have a multitude of meanings even within a single film; for instance, red is used to symbolise both love and death in *Sin City* and *Dick Tracy*.

As previously identified, although colour perception is not completely universal, varying between languages, the current culture/environment, males, females and even between individual's memories; at the same time, similarities exist within our perception as all normal adults process colour in the same way. However since the symbolisation of colour changes between cultures, if an image maker wishes to use colour symbolisation to send a particular message, they must be aware that their meaning will vary amongst different cultures.

As highlighted in the case studies, all cinematographers use colour to affect the viewer's mood whether consciously or unconsciously. By learning more about the intellectual, symbolic and unconscious physiological response, it will help cinematographers explain the reasons for selecting certain colours. What may have been chosen by intuition without explanation might be explained by science. Perhaps this ever growing science will change the way artists make their creative decisions. Scientific research makes us aware of our unconscious decisions and

cinematographers are better able to explain and defend their choices. Ultimately by learning more about colour science, it will give cinematographers the knowledge to create ever more meaningful and more emotionally powerful narratives.

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